

**TAB N**  
**TO EXHIBIT 14**

**REDACTED IN FULL**

**TAB O**  
**TO EXHIBIT 14**

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

CRYOVAC, INC.,  
Plaintiff and Counter-Defendant,

v.

PECHINEY PLASTIC PACKAGING, INC.,  
Defendant and Counter-Plaintiff.

Civil Action No. 04-1278

Hon. Kent A. Jordan

Declaration of Seymour G. Gilbert

I, Seymour G. Gilbert, declare as follows:

1. I received my B.S. degree in 1935, M.S. degree in 1938, and Ph.D. in 1941 from Rutgers University.
2. I worked at Pabst Company as a Research Chemist from 1951-1958.
3. I began as a principal scientist at Milprint, Inc. in 1958 and left in 1965 as the Corporate Technical Director.
4. I served as Professor of the Food Science Department at Rutgers University from 1965-1988.
5. I served as Deputy Director of the Packaging Science and Engineering Program in the Engineering School at Rutgers University from 1988-1998.
6. I have patents on packaging films, as well as, other areas. My 200 publications include work on polymers and their uses, including multilayer films. I consulted, designed and produced the food packaging multilayer films used on the Apollo project.
7. I have conducted several studies for Allied Chemicals since coming to Rutgers in 1965. I developed special tests for evaluating packaging materials, starting at Milprint, and made such studies and major research studies after coming to Rutgers with regular publication of research findings. By agreement with Allied, the results of the studies which began in 1981 were to be published. The film samples and financial aid were provided by Allied. There were two studies for Allied.

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8. The first study for Allied was completed by 1982 and its results were described in at least: 1) the article "Study of Barrier Properties of Polymeric Films to Various Organic Aromatic Vapors" by S.G. Gilbert, E. Hatzidimitriu, C. Lai and N. Passy in the 1983 Edition of Instrumental Analysis of Foods Recent Progress Volume 1; and 2) the article "Environmental and Material Composition Effects on Film Permeability as Related to Meat Packaging" by Seymour G. Gilbert, Grace R. Huang-Lai and Christopher C. Lai presented at the 36th Annual Reciprocal Meat Conference held on June 12-15, 1983.

9. The second study for Allied commenced around 1983 and included a film having the structure HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE. I received all the films of the second study for Allied at the same time. The second study for Allied was described in at least: 1) the article "Nylon Film Effective Packaging" in the December 14, 1984 Journal of Commerce ("Journal of Commerce Article"); 2) the Allied Engineered Plastics News Release "Rutgers Study Confirms Nylon Barrier Properties for Food and Other Sensitive Packaging" ("Allied News Release"); and 3) the article "Odor Barrier Properties of Multi-Layer Packaging Films at Different Relative Humidities" by E. Hatzidimitriu, S.G. Gilbert and G. Loukakis in the March-April 1997 issue of Journal of Food Science ("Journal of Food Science Article").

10. I agree with the Allied News Release that the films of the second study for Allied were coextruded.

11. The Journal of Commerce Article disclosed nylon and EVOH used together in film structures. The first study did not include a film with nylon and EVOH used together in film structures. Only the second study included a film with nylon and EVOH used together in film structures. Therefore, the study described in the Journal of Commerce Article as "Rutgers is currently conducting additional testing for Allied" is the second study for Allied.

12. The objectives of these two studies for Allied were to determine the physical and chemical properties of film for food packaging, principally, water, gas and odor contaminant permeabilities, and physical endurance during fabrication and its long use.

13. Two main protocols were used for these two studies for Allied. The first

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was for physical properties which uses a preliminary conditioning under various environmental stress conditions of temperature and humidity followed by a severe physical stressing. We used an apparatus developed by Gelbo which used the cylindrical test films suspended between two mandrels and a motor which applied both rotation and twisting to severely stress both machine and transverse directions as related to the manufacturing process. The test is particularly useful in multilayer films held together by tie layers as it applies stress to the structure as might be applied during package formation and shipping.

14. One of the factors for such properties is crystallinity and the degree of orientation of the various polymers used. All of the films supplied were tested independently prior to use at Rutgers for identifying physical and chemical properties prior to experimental use. This is done to ensure identity and to help interpret the results of sample films.

15. The methods include physical tests such as: 1) Instron Tester, which provides stress data relating to orientation; 2) Cross Polarization to visualize orientation; 3) infrared tests to identify the various components of multilayer film including its chemical composition and thickness; and 4) special gas and organic vapor permeability for barrier properties by test methods developed at my laboratory known as the Gilbert-Pegaz tester.

16. It is my recollection that results of the Instron Tester and the Cross Polarization tester showed that the 1.4 mil HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE film, identified as Film C in the Journal of Food Science Article, was oriented.

17. It is my recollection that the infrared spectra obtained from the individual layers of the 1.4 mil HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE film, identified as Film C in the Journal of Food Science Article, did not show any obvious differences in either composition or thickness of the corresponding layers around the center. Such differences would have been noted in our publications.

18. The permeation rates for Film C, as disclosed in Tables 2 and 3 of the Journal of Food Science Article, are consistent with the permeation rates of an oriented multilayer film exhibiting high barrier properties.

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19. I was retained by Pechiney Plastic Packaging, Inc. as a consulting expert.

I have consulted on matters other than the studies for Allied Chemicals.

I declare under penalty of perjury that the foregoing is true and correct.

Date: August \_\_, 2005

Seymour G. Gilbert

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was for physical properties which was a preliminary conditioning under various environmental stress conditions of temperature and humidity followed by a severe physical stressing. We used an apparatus developed by Oehler which used the cylindrical test film suspended between two rods and a motor which applied both tension and twisting to severely stress both machines and transverse directions as related to the manufacturing process. This test is particularly useful in multilayer films held together by the layers as it applies stress to the structure as might be applied during package formation and shipping.

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15. The various physical properties tests such as: 1) Infrared Tester, which provides stress data relating to orientation; 2) Cross Polarization to visualize orientation; 3) Infrared tests to identify the various components of multilayer film including its chemical composition and thickness; and 4) special gas and organic vapor permeability for barrier properties by test methods developed in my laboratory known as the Oehler-Taper Tester.

16. It is my recollection that results of the Infrared Tester and the Cross Polarization tester showed that the 1.4 mil HDPE/TEFLON/VOH/NYLON/TEFLON/HDPE film, identified as Film C in the Journal of Food Science Article, was oriented.

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I declare under penalty of perjury that the foregoing is true and correct.

Date: August 16, 2005

Raymond G. Gilbert  
Raymond G. Gilbert

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TO PROTECTIVE ORDER

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**TAB P**  
**TO EXHIBIT 14**



## CHEMICALS/PLASTICS

THE JOURNAL OF COMMERCE, Friday, December 14, 1994

## L MARKETS

will remain unchanged and range from \$215 per ton on standard grade from St. Louis to \$335 per ton from Cody, Wyo. Schedule prices for rayon grade caustic soda will stay \$20 per ton higher than standard grade.

The latest price change is the eighth announced by domestic caustic producers. The industry-wide caustic increase began when Occidental raised prices on Oct. 29. Within days, PPG, Dow, Diamond Shamrock and LCP followed. Last week, Olin and FMC announced their own price advances.

## Benzoyl Peroxide

The U.S. Peroxyglen Division of Witco Chemical Corp. has announced price increases for five benzoyl, peroxyketal and peroxyester organic peroxides effective Jan. 1, 1995.

The 8 percent price increase for the materials, range from 18 cents to 31 cents per pound in truck load quantities. New price increases for the peroxides, which are used as initiators in reinforced plastics manufacture and resin polymerization are as follows:

- BZW-70 benzoyl peroxide — 18 cents.
- BZW-75 benzoyl peroxide — 18 cents.
- BZW-80 benzoyl peroxide — 18 cents.
- USP-400P peroxyketal peroxide — 31 cents.
- Experox 10 peroxyester peroxide — 22 cents.

The company increases have been necessitated by rising costs of raw materials.

Witco Chemical is the second producer of benzoyl peroxide to raise prices.

## Sulfur

Freeport Minerals Company, a subsidiary of Freeport-McMoRan Inc., has announced that it is rescinding part of a \$15 per long ton increase in the price of domestic sulfur announced by the company Nov. 30.

To remain competitive with prices established by other major sulfur producers, Freeport is reducing the \$15 per long ton increase to \$10 per long ton. The change will take place immediately for all spot customers and as contracts permit.

Pleads Guilty  
Closure Case

As part of a plea bargain agreement, mislabeling charges against the three and a fourth executive will be dismissed, Smith said. The executives all are doctors.

"This is not a renegade company," Selby's lawyer, Donald Goldberg, said at the hearing. "It's a company that likes to do right."

## EXHIBIT

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## W-L Promotes Fino

Journal of Commerce Special

MORRIS PLAINS, N.J. — Warner-Lambert Co. has announced the promotion of Raymond M. Fino to vice president-human resources. Mr. Fino

Defendant's Trial  
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ICI Will Purchase  
Beatrice Chemical

Journal of Commerce Special

CHICAGO — Imperial Chemical Industries P.L.C. and Beatrice Cos. Inc. announced Thursday that they have signed a definitive agreement by which ICI will purchase the Beatrice Chemical operations from Beatrice Cos. Inc. for a price of \$750 million, payable in cash.

The transaction is expected to close in the first quarter of 1995.

Beatrice Chemical is a major producer of formulated performance plastics and composite materials and markets a wide range of specialty chemicals internationally. In the year to Feb. 29, Beatrice Chemical reported sales of \$440 million and pre-tax profits of \$63 million (net earnings after-tax \$33 million). Present indications are that sales and pre-tax profits for the current year will be about \$460 million and \$75 million respectively (net earnings \$40 million). The book value of the assets (less liabilities) to the accounts of Beatrice Cos. Inc. amounts to approximately \$155 million.

Commented John Harvey-Jones, chairman of ICI, "In a single move this immediately puts ICI among the world leaders in high growth advanced materials, further and the development of our international specialty chemicals business, and enhances the spread of our existing successful operations in the United States. We are delighted to have negotiated the deal with Beatrice, and we are confident that our international marketing network will increase further the growth potential of the businesses we are acquiring."

As well as bringing new businesses to ICI which are profitable in their own right, Beatrice Chemical's strong market and distribution position in specific fields will provide a powerful vehicle for ICI's own new products and technology. Beatrice Chemical will also provide a valuable complement to ICI's interests in acrylic polymer intermediates for paints and coatings, while the overall acquisition is a further major step in the growth of ICI's business in the United States.

Beatrice Chemical, which employs 3,500 people and has operations in 18 countries, principally the United States, Canada and Europe, is composed of several businesses. Fiberite Composite Materials is a market leader in the supply of advanced composites to the defense and aerospace industries, while LNP is a leading independent supplier of reinforced thermoplastics compounds in the United States. The materials businesses also include Fiberite Molding Materials, which has a strong position in reinforced engineering plastics, and Dri-Friol Foils, which manufactures decorative and functional hot-stamping transfer foils.

Beatrice Chemical's other businesses are primarily in the supply of specialty chemicals and associated customer service. Stahl and Paule Chemicals are world leaders in the supply of finishes for leather.

"This is our largest acquisition since we bought Atlas Chemical Industries Inc. in 1971," said Brian Smith, ICI director for the Americas.

Carbide Accident Spurs  
Closer Look at OSHA

United Press International

WASHINGTON — Lawmakers were questioned whether federal officials have been vigilant enough in protecting workers at Union Carbide's West Virginia chemical plant in light of the devastating chemical accident in India.

At a congressional hearing, Rep. Joseph Gaydos, D-Pa., chairman of a House subcommittee on health and safety, challenged Occupational Safety and Health Administration officials on possible complacency about the Institute, W.Va., chemical plant. "I have sensed... a lack of sincerity in enforcing" worker safety laws, he said. "It has been most unsatisfactory in the past."

Rep. Steve Gunderson, R-Wis., asked OSHA officials why the Institute facility, the only one in the United States that produces methyl

isocyanate, had not been inspected since 1982. A Dec. 3 leak of the poisonous chemical in Bhopal, India, killed more than 2,000 people.

In response, OSHA officials said workers at the Institute plant appeared "well-protected," and that top inspectors were now inspecting evacuation and safety procedures.

"The agency has conducted 32 inspections of that facility since 1973, 11 of these since 1980," said Robert Rowland, assistant Labor secretary for occupational health and safety. He said the agency does not have the resources to inspect every plant every year.

"I think from what I have seen, it appears to be a safe plant."

Dick James, a Mechanisms union official at Institute, also testified that workers at the West Virginia plant considered it a safe facility.

Swiss Chemical Sales  
Rise 8.2% for Quarter

Journal of Commerce Staff

ZURICH, Switzerland — Swiss chemical industry sales during the third 1994 quarter were up 8.2 percent from the like 1993 period. During the first nine months of this year they registered a 10.1 percent increase.

This advance for the January-through September span was accompanied by a 5.7 percent production rise. This, though, was not distributed evenly.

On the one hand, as reported by the Swiss chemical industry society, the output of dyes, lacquers, aromatic and organic chemicals, as well as synthetic products gained. While production of pharmaceutical products stagnated, that of pesticides was down sharply, and that of soap and detergents showed a lesser decrease.

## PLASTICS CORNER

Nylon Film  
Effective  
Packaging

Journal of Commerce Staff

A study recently undertaken for Allied Corp.'s Engineered Plastics Group, Morristown, N.J., shows that nylon film extrusions provide cost-effective flavor and aroma protection for food packaging.

The research, conducted by Dr. Seymour Gilbert, who heads Rutgers University Food Science Department, compared the flavor and aroma barrier properties of commercially available packaging materials with common organic compounds associated with food ingredients and laminated materials used for food packaging.

The film materials tested included nylon, polyvinylidene chloride, ethyl vinyl alcohol and glassine. The results indicate that nylon provides good to excellent protection against the permeation of flavors and aromas and offers the most economic barrier per mil thickness.

Also, the study noted that nylon provides excellent grease and oil resistance and high-temperature performance as well as impact, puncture and tear-resistant properties. Coextruded films with thin nylon cores proved to have the broadest range of performance properties of the films tested with optimum flavor and aroma barrier.

These findings are important to packagers of shelf-stable foods including baked goods, candies, confections, flavor-enhanced cereals, cake mixes and snack foods that need to keep in their flavors for long periods and to keep out odors and flavors during handling, shipping and storage.

The Rutgers' study represents the first time that data has been compiled for specific permeants that affect flavor and aroma of packaging foods. The testing procedure involved the use of a special permeation cell developed by Dr. Gilbert. Test films were pre-conditioned and aged for 10 days at 20 degrees Fahrenheit at 100 percent relative humidity and Gelbo flexed 20 times to simulate shipping and handling conditions.

Film samples were clamped in the permeation cell and test compounds in concentrations of 100 ppm were introduced to chambers within the cell. At intervals, the concentrations of test compounds in the chamber were measured by gas chromatograph to determine the permeation rate of the compounds. The items tested included allyl sulfide (oil of garlic) and acetic acid (vinegar), methyl ethyl ketone and ethyl acetate (solvents used in food packaging), and toluene (aromatic chemical used to simulate automobile and truck exhaust).

The nylon film extrusions outperformed the other film structures tested with the exception of those including EVOH, which proved to have better permeation resistance to acetic acid, ethyl acetate and toluene. In all instances, however, the performance of the nylon film proved acceptable compared with EVOH, which is much more costly than nylon.

Nylon and EVOH can be used together in film structures, sandwiched as a core between layers of high-density polyethylene or other polyolefins for moisture protection, to provide an extremely cost-effective barrier to aromas, flavors and odors. Nylon forms an inseparable bond with EVOH, protects the more

sensitive EVOH from heat degradation and flex cracking and serves as a moisture absorber. Both nylon and EVOH are said to have excellent oxygen-barrier properties.

Rutgers is currently conducting additional testing for Allied. Different permeants and packaging structures will be used to further evaluate nylon's role as a flavor, aroma and odor barrier.

Allied is a leading supplier of nylon resins and films that are used for packaging cake mixes, frozen foods, candies, snack foods, processed meats and cheeses, medical devices and other demanding applications. For additional information on the Allied/Rutgers testing, contact Mr. Len Edison, Food Industry Manager, Allied Engineered Plastics, P.O. Box 2132R, Morristown, N.J. 07950.

New Workshops Explore  
Production Techniques

As more products are made with plastics, educators have found new ways to train students in the techniques of manufacturing with these materials.

However in doing so, they have been faced with some difficult problems. In order to set up effective courses, schools have had to rely on commercial equipment for heating, forming, reinforcing, cementing, welding and otherwise fashioning these modern materials. Because the machinery is priced for industry and several must be bought to cover the desired course material, capital costs run high. In addition, the machines are not designed or fixtured to further educational objectives or to withstand student wear and tear.

A new Plastics Workshop Bench, Model 2001, produced by Technovate/Vavlin Plast now solves these problems.

The new Plastics Workshop Bench packs into just four square feet all the equipment and provides all the accessories needed to instruct students in twelve of the most used processes employed today in the manufacture of products made with plastics.

All the action is in plain sight at table-top height. In addition, the configuration of the table covers laboratory space and allows for clear aisles. The unit is fully self-contained and requires only 100 volt ac current to operate.

The Technovate/Vavlin Plastics Workshop is distributed by Technovate Inc., Pompano Beach, Fla.

PMA Offers '84 Edition  
Of Testing Handbook

The Polyurethane Manufacturers Association has published a revised "1984 Testing Methods for Polyurethane Products" handbook, comprised of more than 60 American Society for Testing Materials testing standards for urethanes. The new handbook includes 18 new standards for cast urethanes and also 23 testing standards for reaction injection molding in both cellular and solid elastomer categories.

"The revision of the handbook and the addition of the many standards is due to new technology in urethane applications and increasingly stringent testing requirements for them," said Ben Hurdain, project manager for Mobay Chemical Corp. and chairman of the PMA's ASTM handbook subcommittee.

Copies of PMA's "1984 Testing Methods for Polyurethane Products" are available for \$40 to members and \$50 to non-members from PMA, Building C, Suite 20, 800 Roosevelt Road, Glen Ellyn, Ill. 60137.

## CHEMICALS/PLASTICS

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Commented John Harvey-Jones, chairman of ICI, "In a single move immediately puts ICI among the world leaders in high growth added materials, furthering and the development of our international specialty chemicals business; and eases the spread of our existing successful operations in the United States. We are delighted to have completed the deal with Beatrice, we are confident that our international marketing network will increase further the growth potential of businesses we are acquiring."

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Beatrice Chemical's other businesses are primarily in the supply of specialty chemicals and associated customer services. Stahl and Paule Chemicals are world leaders in the supply of finishes for leather.

"This is our largest acquisition since we bought Atlas Chemical Industries Inc. in 1971," said Brian Smith, ICI director for the Americas.

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WASHINGTON — Lawmakers questioned whether federal officials have been vigilant enough in acting on workers at Union Carbide's West Virginia chemical plant site of the devastating chemical leak in India.

In a congressional hearing, Rep. Philip Geydes, D-Pa., chairman of a subcommittee on health and safety, challenged Occupational Safety and Health Administration officials on possible complacency about the Institute, W.Va., chemical plant. "We have sensed... a lack of sympathy in enforcing" worker safety, he said. "It has been most satisfactory in the past."

Rep. Steve Gunderson, R-Wis., said OSHA officials why the Institute facility, the only one in the United States that produces methyl

isocyanate, had not been inspected since 1982. A Dec. 3 leak of the poisonous chemical in Bhopal, India, killed more than 2,000 people.

In response, OSHA officials said workers at the Institute plant appeared "well-protected," and that top inspectors were now inspecting evacuation and safety procedures.

"The agency has conducted 32 inspections of that facility since 1973, 11 of these since 1980," said Robert Rowland, assistant Labor secretary for occupational health and safety. He said the agency does not have the resources to inspect every plant every year.

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Swiss Chemical Sales

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The film materials tested included nylon, polyvinylidene chloride, ethyl vinyl alcohol and glassine. The results indicate that nylon provides good to excellent protection against the permeation of flavors and aromas and offers the most economic barrier per mil thickness.

Also, the study noted that nylon provides excellent grease and oil resistance and high-temperature performance as well as impact, puncture and tear-resistant properties. Coextruded films with thin nylon cores proved to have the broadest range of performance properties of the films tested with optimum flavor and aroma barrier.

These findings are important to packagers of shelf-stable foods including baked goods, candies, confections, flavor-enhanced cereals, cake mixes and snack foods that need to keep in their flavors for long periods and to keep out odors and flavors during handling, shipping and storage.

The Rutgers' study represents the first time that data has been compiled for specific permeants that affect flavor and aromas of packaging foods. The testing procedure involved the use of a special permeation cell developed by Dr. Gilbert. Test films were pre-conditioned and aged for 10 days at 70 degrees Fahrenheit at 100 percent relative humidity and Gelbo flexed 20 times to simulate shipping and handling conditions.

Film samples were clamped in the permeation cell and test compounds in concentrations of 100 ppm were introduced to chambers within the cell. At intervals, the concentrations of test compounds in the chamber were measured by gas chromatograph to determine the permeation rate of the compounds. The items tested included allyl sulfide (oil of garlic) and acetic acid (vinegar), methyl ethyl ketone and ethyl acetate (solvents used in food packaging) and

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As more products are made with plastics, educators have found new ways to train students in the techniques of manufacturing with these materials.

However in doing so, they have been faced with some difficult problems. In order to set up effective courses, schools have had to rely on commercial equipment for heating, forming, reinforcing, cementing, welding and otherwise fashioning these modern materials. Because the machinery is priced for industry and several must be bought to cover the desired course material, capital costs run high. In addition, the machines are not designed or fixtured to further educational objectives or to withstand student wear and tear.

A new Plastics Workshop Bench, Model 2001, produced by Technovate/Yavin Plast now solves these problems.

The new Plastics Workshop Bench packs into just four square feet all the equipment and provides all the accessories needed to instruct students in twelve of the most used processes employed today in the manufacture of products made with plastics.

All the action is in plain sight at table-top height. In addition, the configuration of the table saves laboratory space and allows for clear aisles. The unit is fully self-contained and requires only 100 volt ac current to operate.

The Technovate/Yavin Plastics Workshop is distributed by Technovate Inc., Pompano Beach, Fla.

## PMA Offers '84 Edition Of Testing Handbook

The Polyurethane Manufacturers Association has published a revised "1984 Testing Methods for Polyurethane Products" handbook, comprised of more than 60 American Society for Testing Materials testing standards for urethanes. The new handbook includes 18 new standards for cast urethanes and also 25 testing standards for reaction injection molding in both cellular and solid elastomer categories.

"The revision of the handbook and the addition of the many standards is due to new technology in urethane applications and increasingly stringent testing requirements for them," said Ron Haradzin, project manager for Mobay Chemical Corp. and chairman of the PMA ASTM handbook subcommittee.

Copies of PMA's "1984 Testing Methods for Polyurethane Products" are available for \$40 to members and \$50 to non-members from PMA, Building C, Suite 20, 800 Roosevelt Road, Glen Ellyn, Ill. 60137.

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# The Journal of Commerce

AND COMMERCIAL

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NO. 25,871

NEW YORK, FRIDAY, DECEMBER 14, 1984

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### SHIPPING

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### INSURANCE

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## US Seeks Special Role In Japan

Communications Gear:  
Reagan Bids Access  
For American Exports

By A.E. CULLISON  
Journal of Commerce Staff

TOKYO — The Nakasone administration has received a formal request from Washington seeking special consideration in providing greater access to Japan's multimillion-dollar market for highly competitive U.S. equipment when the Japanese decontrol their domestic communications services next April.

Japanese government officials, who disclosed Thursday that the six-point U.S. request was received earlier this week through diplomatic channels, pointed out that the Reagan administration specifically asked for participation of representatives of American firms in an organization to be set up in Japan for approval and inspection of communications apparatus.

The organization is scheduled to begin work following the transfer of the Nippon Telegraph and Telephone Public Corp. to private enterprise status.

A package of bills designed to turn the corporation into a private company cleared Japan's House of Councilors Communications Committee Thursday and is expected to be passed by the upper house today. A similar vote of approval by the lower house probably will take place next Thursday.

The new telephone and telegraph firm is expected to begin operating as of April 1, 1985. Its annual revenues already have been estimated at \$18.57 billion.

According to the Japanese government authorities, the U.S. request also sought clarification and maximum possible expansion of the scope of terminal apparatus that is to be

SEE US SEEKS, PAGE 5A

## Bhopal Disaster Likely to Lead To Tighter Industrial Coverage

By EDWIN UNSWORTH  
Journal of Commerce Staff

LONDON — The disaster resulting from the escape of gas from Union Carbide's chemical plant at Bhopal, India, earlier this month came too late to influence the current insurance renewal season, but it is likely to harden insurers' attitudes in future.

Although it almost certainly will be a number of years before the level of claims arising out of the Bhopal disaster become known, the filing of a \$15 billion lawsuit against Union Carbide on behalf of the relatives of victims gives some indication of the potentially huge sums involved.

If, as Union Carbide has claimed, its comprehensive insurance cover is sufficient to meet all claims, then it is clear the insurance industry will bear the entire burden.

In itself, the Bhopal catastrophe might not have been sufficient to cause insurers to adjust liability rates upwards, but it comes at a time when insurers and reinsurers are suffering from some of their largest underwriting losses ever and have been arguing for the last few years that the

Underwriters have been arguing for the last few years that the industry desperately needs a tightening of premiums and terms of cover.

industry desperately needs a tightening of premiums and terms of cover.

A disaster on the scale of Bhopal therefore will fuel these arguments. Most of the insurance cover in the Indian disaster seems to have been placed in the United States, restricting London's involvement mainly to an undisclosed amount of reinsurance cover.

However, underwriters nevertheless expect that given the drive already under way to tighten rates and terms on some classes of business, the Bhopal incident will influence the move in this direction.

The Indian tragedy raises two basic questions for insurers: The problem of how such incidents can be prevented or handled in developing

countries and how to cover the liabilities of multinational groups.

Richard Lake, general manager of British and European Reinsurance, said that after a string of major incidents, such as the nuclear power leak at Three Mile Island and the gas explosion in Mexico City, reinsurers already had been taking a hard look at their liability exposures.

He said that incidents involving multinational groups highlight the realization "that no area can be thought of in isolation."

One of the concerns among reinsurers is the high level of U.S. court awards in industrial liability cases.

Because of this insurers have long since charged premiums to companies operating in the United States that reflect this greater exposure. But now with so many more non-American claimants taking their cases to the U.S. courts — as is happening in the Bhopal case — insurers think it is more necessary than ever to look at a company's whole geographic com-

SEE DISASTER, PAGE 7A

## Indian Insurers Weigh Carbide Case

By JAMES NOLAN  
Journal of Commerce Staff

NEW YORK — "India has the largest cattle population in the world," and when the insurance industry there was nationalized, "the priority concern was to introduce cattle insurance policies..." which extended also "to sheep, camels, poultry, etc."

This was how matters stood in 1982, according to V.H.P. Pinto, manager of the General Insurance Corp. of India, a government-owned enterprise.

And this is how matters still stand. A poignantly pathetic infant of an industry — concerned mainly with supporting and nurturing the rural population and their cattle, sheep poultry and farm irrigation pumps — suddenly has been asked to confront the worst industrial accident in history.

In the pre-dawn hours of Dec. 3, a gas tank valve at a Union Carbide pesticide plant in Bhopal in central India ruptured, leaking several tons of poison gas which killed 2,500 and maimed and blinded countless thousands more.

By law, the liability insurance on the plant, co-owned by Union Carbide of Danbury, Conn., and the government of India, was underwritten first by the nationalized

insurance industry. The guess in the U.S. insurance community is that the policy had a \$1 million limit, because that is about the "capacity" of the Indian insurance market.

Capacities in insurance means what it says: If a claim were higher than that, there would be no reserves to cover the claim and the insurer would be forced to dip into assets to pay off.

Coverage beyond the Indian market capacity — perhaps up to \$200 million — was "told off" or reinsured by U.S. companies.

But even this capacity will be sorely tried. Already, a \$15 billion lawsuit has been filed in the United States on behalf of two Indian families whose members were among those killed in Bhopal, a heavily populated city in the central agricultural region.

Mr. Pinto's description of the Indian insurance industry came in an essay he wrote for "Insurance in the World's Economies," a publication of the proceedings of an international insurance congress in Philadelphia in 1982.

Understandably proud, Mr. Pinto declared that "the

SEE INDIA'S, PAGE 7A

## Ship Groups Seek Review Of Contracts

By ROBERT F. MORISON  
Journal of Commerce Staff

WASHINGTON — Seven ocean carrier rate-making conferences are asking the Federal Maritime Commission to take another look at the agency's view of loyalty contracts and the new service contracts.

The conferences say the way the agency's opinion is now phrased, it "serves no purpose other than to deter the use of service contracts."

The new Shipping Act of 1984 permits service contracts between carriers and shippers whereby the ocean carrier or conference agrees to provide a certain level of service over a given period of time. But the commission is drafting the specific rules for implementation of the act.

The petition for reconsideration focused on the commission's opinion that service contracts that require shippers to guarantee a fixed portion

## US Scheduled Air Forecast Banner

By ANITA SCHRODT  
Journal of Commerce Staff

NEW YORK — U.S. scheduled airlines expect to set a record \$2 billion operating profit and hit new highs in passenger and cargo traffic this year.

However, the airlines will not be hitting their 1978 high of \$1.2 billion in net profit this year, because of high interest costs, according to George James, senior vice president-economics and finance for the Air Transport Association, the Washington-based airline trade organization.

Mr. James noted his \$2 billion operating profit forecast for 1984 is up slightly from the \$1.6 billion to \$1.8 billion he was projecting earlier this year.

For 1985, he is projecting the scheduled airlines again will see a \$2 billion operating profit, with his forecast coming in slightly under the \$2.5 billion to \$2.8 billion some Wall Street analysts have estimated.

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While call cial performance encourage recent years cial results," with the high year's industry in a profit in percent, well average profit percent.

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## Odor Barrier Properties of Multi-Layer Packaging Films at Different Relative Humidities

E. HATZIDIMITRIU, S. G. GILBERT, and G. LOUKAKIS

### ABSTRACT

A permeation cell method was developed for the determination of transmission rates of organic vapors through flexible packaging materials. The permeation rates at 23°C of some compounds for several composite films at 0% and 75% relative humidity (RH) indicated that the polyethylene vinyl alcohol and nylon combinations exhibited superior barrier properties even at elevated RH, provided that moisture barrier films were present in the laminate construction.

### INTRODUCTION

THE EXPANDING USE of plastics in packaging applications competing with glass and metal puts great emphasis on the high barrier properties of the involved materials against moisture and glass (Allison, 1985) to assure an acceptable shelf life of a packaged product.

The permeation of packaging materials to odorous vapors is of significant importance, either to protect the contents against contamination from foreign odors or to retain favorable volatile flavors. Although the permeation rates of permanent gases and water vapor through many plastics have been obtained, there is a deficiency of data for permeation of organic vapors (Zobel, 1985).

The object of this study was to develop a method for quantitative evaluation of the aroma barrier of packaging materials. A series of flexible plastic films of various compositions were then tested for their permeability to some flavoring and malodorous compounds.

### MATERIALS & METHODS

THE METHOD is based on the Gilbert-Pegaz permeation cell (Gilbert and Pegaz, 1969). As Fig. 1 indicates, the cell can accommodate simultaneously two films by clamping each between aluminum devices to form a pair of outer chambers and a single inner one (Gilbert et al., 1983). The devices are equipped with Viton O-rings to assure good seal between the films and the surroundings. Chambers on either side of the film have valves for inlet and outlet of permeant supply and septa for sampling.

Nitrogen is bubbled through the liquid permeant and then passed with the permeant vapors through either the middle chamber or the lower and upper compartments. Thus either one cell can be used for duplicates or in the case of very good barriers, the exposed area can be doubled. The nitrogen stream carrying the permeant vapors can be mixed before the cell with either dry or wet nitrogen to adjust the permeant final concentration or the relative humidity of the high concentration chamber. In the case of permeants with very low vapor pressure at ambient temperature, a small amount can be placed in an aluminum dish on the bottom of the cell. If adjustment of the humidity is desired, another dish with an aqueous saturated salt solution can also be placed on the bottom (Fig. 2).

The tested films appear in Table 1 with their respective compositions and thicknesses. Each film was Gelbo flexed (ASTM, 1982) for 20 cycles prior to testing to simulate severe abuse which may be encountered in packaging and distribution. All films to be exposed to a 75% RH environment at 23°C were kept for a period of 2 wk in a

desiccator over saturated sodium chloride solution. Then they were tested with the permeant vapor stream combined with controlled humidity nitrogen to provide the elevated humidity level during testing. The permeants used for the tests are also given in Table 1.

The concentrations of the permeating vapors and related humidity were monitored by gas chromatography with removal of small aliquots

Table 1—Films used for the permeation studies

- |   |                            |
|---|----------------------------|
| A. 1.25 MI HDPE/TIE/NYLON/EVA               | High density polyethylene  |
| B. 1.25 MI HDPE/TIE/EVOH/EVA                | Adhesive layer             |
| C. 1.40 MI HDPE/TIE/NYLON/EVOH/NYLON/TEHDPE | Nylon 6                    |
| D. 2.28 MI HDPE/TIE/MODIFIED/NYLON/TEHDPE   | Polyethylene vinyl acetate |
| E. 1.0 MI (oriented) PP/TIE/EVOH/TEPP       | Polyethylene vinyl alcohol |
| F. 1.0 MI PP/TIE/PET-G/TIE/PP               | Mineral filled nylon-6     |
| G. 1.8 MI PVDC coated co-ex OPP             | Polypropylene              |

- |                |                                   |
|----------------|-----------------------------------|
| Where: HDPE    | High density polyethylene         |
| TIE            | Adhesive layer                    |
| NYLON          | Nylon 6                           |
| EVA            | Polyethylene vinyl acetate        |
| EVOH           | Polyethylene vinyl alcohol        |
| Modified NYLON | Mineral filled nylon-6            |
| PP             | Polypropylene                     |
| PET-G          | Polyethylene terephthalate-glycol |
| PVDC           | Polyvinylidene chloride           |
| OPP            | Oriented polypropylene            |

- |                  |                         |
|------------------|-------------------------|
| 1. Ethyl acetate | 4. Limonene             |
| 2. Toluene       | 5. beta-Pinene          |
| 3. Styrene       | 6. Ethyl phenyl acetate |

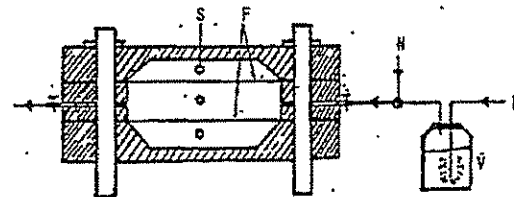


Fig. 1—Permeation cell arrangement for high vapor pressure permeants: (N) Nitrogen inlet; (V) Glass vial containing liquid permeant; (F) Film samples; (S) Septa for sampling.

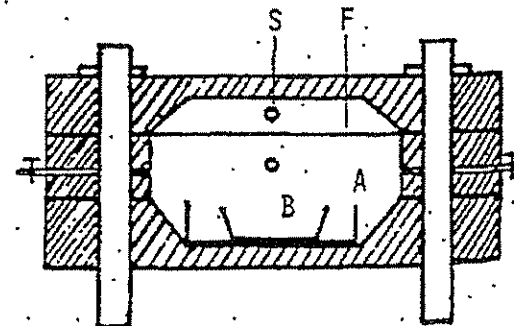


Fig. 2—Permeation cell arrangement for low vapor pressure permeants: (A) Dish with aqueous saturated salt solution; (B) Dish with permeant; (F) Film sample; (S) Septa for sampling.

The authors are with the Dept. of Food Science, Cook College, New Jersey Agricultural Experiment Station, Rutgers Univ., New Brunswick, NJ 08903.

Film  
A  
B  
C  
D  
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Film  
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C  
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using a gas monitored curve. The in combina permeant c of permeant However semicrystal permeation ing a lag p after a test nificant pe In this case of the gas film.

While a permeation pressure of etrant all fi ration for l of permeant especially v

THE CAL permeant . 75% RH, to 100 ppt ference ac from Table It should t to a unit d of relative vapor con the vapor .

At 0% F exhibited t 3). The ny the 'HDPE permeable the least b acetate and

For the almost equ certain per beta-pinen to styrene, barrier to : modified n ance can t



Table 2—Permeation Rates, 0% RH, 23°C (g/m<sup>2</sup>-day-100 ppm)

Film	Ethyl acetate	Toluene	Styrene	Limonene	B-Pinene	Ethyl phenyl acetate
A	<0.003	0.001	<0.0003	0.0409	0.0120	0.0085
B	0.30	0.027	0.0610	0.0012	0.0013	<0.0080
C	<0.0004	0.002	0.0054	0.0014	<0.0004	<0.0080
D	<0.0004	0.001	<0.0003	0.0018	<0.0011	<0.0080
E	<0.0004	0.003	<0.0002	0.0409	<0.0036	<0.0070
F	6.86	1.310	0.0018	0.0315	0.0088	0.234
G	0.52	0.470	0.0046	0.0400	0.0320	0.016

Table 3—Permeation Rates, 75% RH, 23°C (g/m<sup>2</sup>-day-100 ppm)

Film	Ethyl acetate	Toluene	Styrene	Limonene	B-Pinene	Ethyl phenyl acetate
A	0.0032	0.0189	0.0120	0.0009	0.0013	0.0053
B	0.0034	0.0050	0.0037	0.0037	0.0001	<0.002
C	0.0041	0.0083	0.0050	<0.0003	0.0049	<0.002
D	0.0056	0.0088	0.0046	0.0078	0.0020	0.0078
E	0.0092	0.0034	0.0338	0.0081	0.0031	0.0081
F	0.0040	0.0020	0.0096	0.0071	too fast	0.0071
G	0.0095	0.0007	0.0051	0.0050	0.1418	0.0060

using a gas tight syringe (Gilbert and Pegaz, 1969). The plot of the monitored concentration versus sampling time gives the permeation curve. The slope of the steady state portion was determined and used in combination with the chamber volume, exposed film surface and permeant concentration difference across the film for the calculation of permeation rate in appropriate units.

However, for anomalous diffusion, often found with glassy and semicrystalline polymers (Crank and Park, 1968), when the obtained permeation curves did not show a constant or steady state rate following a lag phase, the linear portion of the permeation curve was used after a testing period of two weeks. With very good barriers no significant permeating amount could be detected for certain permeants. In this case the rate was expressed as a value below the detection limit of the gas chromatograph for the permeant driving force across the film.

While a normalized driving force was used in the calculation of the permeation coefficient, the actual driving force depended on the vapor pressure of the permeant at the test temperature. For a specific permeant all films were tested at the same vapor driving force concentration for both relative humidities. Linear concentration dependence of permeation rate was assumed, although this might not be the case, especially with organic vapors (Zobel, 1985).

## RESULTS & DISCUSSION

THE CALCULATED PERMEATION rates for each film and permeant are given in Table 2 for 0% RH, and Table 3 for 75% RH, respectively. The indicated values were normalized to 100 ppm (g permeant/cc of air) permeant concentration difference across the film. For comparison purposes the values from Tables 2 and 3 are presented in Fig. 3 and 4, respectively. It should be emphasized that normalizing the permeation rate to a unit driving force concentration, allows for a comparison of relative barrier properties of the tested films at only one vapor concentration. However this relationship may change as the vapor concentration is changed.

At 0% RH the nylon-EVOH and modified nylon 6 structures exhibited the best barrier properties for all the permeants (Fig. 3). The nylon-6 and both EVOH films followed next although the HDPE/EVOH/EVA combination was significantly more permeable to ethyl acetate. The PET and PVDC structures had the least barrier performance at 0% RH, especially for ethyl acetate and toluene, with PET much more inferior than PVDC.

For the 75% RH environment all the tested films exhibited almost equivalent barrier properties, with some exceptions for certain permeants. PET and PVDC were very permeable to beta-pinene. Also, the PP/EVOH/PP film appeared sensitive to styrene, and the HDPE/nylon 6/EVA structure had a lower barrier to ethyl acetate and toluene compared to EVOH and modified nylon. Overall at 75% RH the best barrier performance can be attributed to nylon 6/EVOH, modified nylon-6

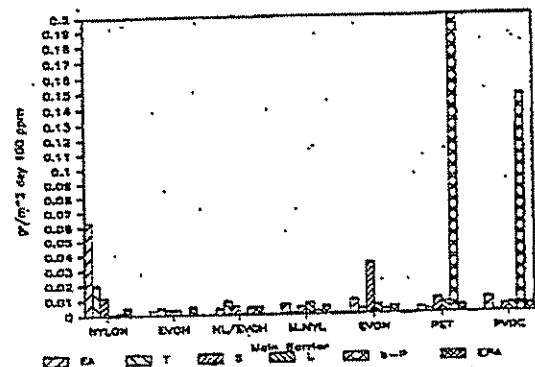


Fig. 3—Permeation rates at 0% RH, 23°C. EA:ethyl acetate, T:toluene, S:styrene, L:limonene, b-B:beta pinene, EPA:ethyl phenyl acetate.

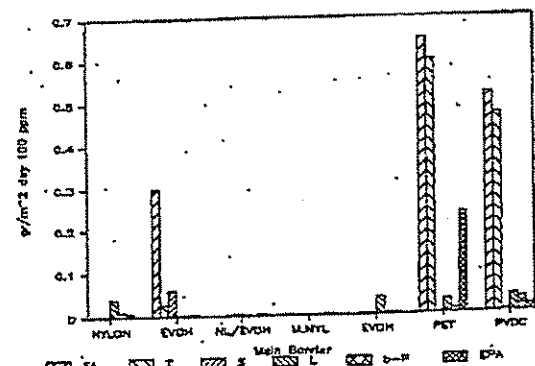


Fig. 4—Permeation rates at 75% RH, 23°C. EA:ethyl acetate, T:toluene, S:styrene, L:limonene, b-B:beta pinene, EPA:ethyl phenyl acetate.

Table 4—Ethyl Acetate Permeation Tests, 23°C, 93% RH

Film	Lag time (hr)	Permeation rate (g/m <sup>2</sup> -day-100 ppm)
A	5.6	0.247
B	24.2	0.021

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## ODOR BARRIER PROPS OF PACKAGING MATERIALS...

and both EVOH combinations. The HDPE/nylon 6 EVA film lost its excellent barrier properties at this RH level probably due to moisture sorption from the polyamide.

Although polyethylene vinyl alcohol (EVOH) also sorbed water, the resulting structure change at the 75% RH did not affect the permeation as much as in nylon-6. A similar difference was observed with polyvinyl alcohol and nylon-6 films for carbon dioxide and oxygen permeation (Ito, 1961; Meyer et al., 1957; Toyoshima, 1973). At 75% RH, polyvinyl alcohol was a better barrier than nylon-6 for the above gases. However, the opposite was true at 93% RH. This could be attributed to higher water sorption by polyvinyl alcohol at 93%, possibly because of a more disrupted structure for the polymer compared to nylon 6.

To determine whether EVOH, despite its ethylene content, would exhibit a similar barrier change at 93% RH as polyvinyl alcohol, when compared to nylon-6, the films HDPE/nylon 6/EVA and HDPE/EVOH/EVA were tested at 93% RH for ethyl acetate permeation. The test results are given in Table 4. The permeation rate at the steady state for nylon-6 was about twelve times faster than for EVOH. This did not agree with what was observed for permanent gases and can be attributed to the ethylene content (about 35% w/w) of EVOH. The ethylene modified the polymer structure so it was not disrupted by water sorption as much as in polyvinyl alcohol.

The lag-time, which is related to the diffusivity through the film (Crank and Park, 1968), was about four times slower for nylon-6 versus EVOH (Table 4). This indicated that ethyl acetate could diffuse four times faster in nylon 6 than in EVOH at 90% RH.

## CONCLUSIONS

The nylon and polyethylene vinyl alcohol (EVOH) laminations at 0% RH appeared to have the best barrier performance which was superior to the polyethylene terephthalate-glycol (PET-G) and polyvinylidene chloride (PVDC) laminations.

A similar trend was observed even at the 75% RH level, where the water sensitive nylon and EVOH seemed to be generally well protected by the outer hydrophobic laminates. Thus the nylon and EVOH combinations maintained a superior barrier performance compared to PET-G and PVDC.

The determined barrier properties of the tested films could help in designing packaging materials which could offer better aroma protection and consequently contribute to qualitative and quantitative shelf life improvement.

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A paper of the Journal Series, N.J. Agricultural Experimental Station, Cook College, Rutgers, The State University, Department of Food Science, New Brunswick, NJ 08903.  
This work was performed as a part of NJAES Project No. D-10533-1-86, supported by the N.J. Agricultural Experimental Station.

## MODIFICATION OF GELATIN BY IMMOBILIZED PROTEASE...From page 466

proteases of different specificities is now being tested to further improve the present data.

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We are grateful to Mr. N. Ito of the Technical Section of the Gelatin Division of Nitta Gelatine Co. Ltd. for measurement of the molecular weights of gelatins and to Mr. S. Yasugi and Mr. E. Sumiki of the Research Laboratory of Nitta Gelatine Co. Ltd. for encouragement and discussion throughout this study.

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**TAB R**  
**TO EXHIBIT 14**

## News Release



Engineered  
Plastics

Allied Corporation  
P.O. Box 2332R  
Morristown, NJ 07960

For further information:

Contact Earl Hatley  
(201) 455-5407

For Immediate Release

### RUTGERS STUDY CONFIRMS NYLON BARRIER PROPERTIES FOR FOOD AND OTHER SENSITIVE PACKAGING

Nylon film coextrusions offer the most cost-effective barrier for flavors, aromas, and odors for food and other sensitive packaging according to the results of a scientific study undertaken by Rutgers University for Allied Engineered Plastics.

The research project, directed by Dr. Seymour Gilbert, head of the Rutgers University Food Science Department, was the second such investigation commissioned by Allied.

Results from the first study, completed three years ago, also demonstrated nylon's cost-effective barrier properties. In that initial research, film materials tested included polyvinylidene chloride (PVDC), ethyl vinyl alcohol (EVOH), and glassine as well as nylon. Films with thin nylon cores proved to have the broadest range of performance properties with optimum flavor aroma barrier. Only EVOH offered better permeation resistance to acetic acid, ethyl acetate, and toluene, although the nylon films provided acceptable permeation resistance at a cost approximately half that of EVOH.

The second research project sought to determine whether nylon and EVOH in a single specification have a synergistic effect on flavor and aroma which would be cost-effective; and to test other film structures with additional permeants which have a broader range in simulating various flavors and aromas used in

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Exhibit  
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-more-

PPPI 008492

-2-

food, medical, and industrial packaging. Where the first study tested film only at zero percent relative humidity, the present investigation would be conducted under conditions of zero and 80 percent humidity; to date, the only results available from the second study are of film structures tested at zero percent humidity.

Dr. Gilbert, who designed the test cell in which the permeation rates were measured, subjected eight different coextruded film structures to nine different permeants. Film samples were clamped in the permeation cell and test compounds in concentration of 100 ppm were introduced to chambers within the cell. Concentration of test compounds in the chambers were measured by gas chromatograph to determine permeation rate of the compounds.

Permeants selected for the tests were methyl ethyl ketone, ethyl acetate, toluene, (all solvents), methyl solicylote, ethyl phenol acetate, limolene, beta-pinene, styrene, and menthol. These include compounds found in breath freshners, soaps, and other products, flavorants, and permeants used to simulate hydrocarbons, undesirable packaging compounds, and organic compounds used in medicinal packaging.

The findings are particularly important to packagers of shelf stable foods such as packaged baked goods, candies, confections, flavor enhanced cereals, cakes, and snack foods.

Combinations of nylon and EVOH do not, Dr. Gilbert's tests showed, produce a significant synergistic effect in terms of barrier properties compared to a nylon-only coextrusion or an EVOH-only coextrusion.

-more-

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-3-

In addition, according to test results, the nylon-only coextrusion, or the modified-nylon coextrusion, showed excellent barrier properties for all permeants compared to a PETG coextrusion and a PVDC-coated oriented polypropylene film.

Nylon also offers excellent resistance to grease and oil, and high-temperature performance as well as impact-, puncture-, and tear-resistant properties.

For detailed findings of the second Rutgers study, see the attached tables for measured permeation for all film structures with all tested permeants, and permability ratings (Poor, Fair, Good, Excellent) based on actual laboratory measurements.

For more information, contact Earl Hatley, Product Manager, Allied Engineered Plastics, PO Box 2332R, Morristown, NJ 07960, (201) 455-5407.

PPPI 008494



Table 1  
Permeability in gr/m<sup>2</sup>dayx100 ppm at 73°F and 0.8RU

Film	Methyl Ethyl Ketone	Ethyl Acetate	Methyl Salicylate	Ethyl Phenyl Acetate	Limonene	B-Pinene	Toluene	Styrene	Menthol
A	0.43	<0.0003	0.0046	0.0085	0.0409	0.0120	0.001	<0.0003	<0.0002
B	0.65	0.30	0.0011	<0.0060	0.0012	0.0013	0.027	0.0610	<0.0001
C	0.90	<0.0004	<0.0003	<0.0080	0.0014	<0.0004	0.002	0.0054	<0.0001
D	0.65	<0.0004	<0.0002	<0.0080	0.0018	<0.0011	0.001	<0.0003	<0.0001
E	0.77	<0.0004	<0.0002	<0.0080	<0.0003	<0.0009	0.0004	0.0005	<0.0001
F	<0.01	<0.0004	0.009	<0.0070	0.0400	0.0036	0.0003	<0.0002	<0.0002
G	2.40	6.86	2.160	0.234	0.0315	0.0088	1.310	0.0018	0.0020
H	0.44	0.52	0.071	0.016	0.0400	0.0320	0.470	0.0046	<0.0002
I	0.02	0.04	0.024	<0.0080	0.0106	<0.0012	0.005	0.0059	0.0011

## FILM KEY:

- A. HDPE/TIE/NYLON/EVA  
 B. HDPE/TIE/EVOH/EVA  
 C. HDPE/TIE/NYLON/TIE/  
 EVOH/TIE/NYLON/TIE/HDPE  
 D. HDPE/TIE/MODIFIED NYLON/  
 TIE/HDPE  
 E. NYLON/EVOH/NYLON/TIE/LLDPE/  
 YIE/LLDPE  
 F. (ORIENTED)PP/TIE/EVOH/TIE/PP  
 G. PP/TIE/PEI/TIE/PP  
 H. PVDC COATED CO-EX OPP  
 I. WAX PAPER/GLASSINE

PPPI 008495

Table 2  
Rating Based on Permeability Values at 73°F and 8RH

Film	Methyl Ethyl Ketone	Ethyl Acetate	Methyl Salicylate	Ethyl Phenyl Acetate	Limonene	B-Pinene	Toluene	Styrene	Menthol
A	G	E	G	F	G	F	E	E	E
B	F	F	G	E	E	G	G	F	E
C	F	E	E	E	E	E	E	G	E
D	G	E	E	E	E	E	E	E	E
E	F	E	E	E	E	E	E	E	E
F	E	E	G	E	G	G	E	E	E
G	P	P	P	P	G	G	P	G	G
H	G	F	F	G	G	F	F	G	E
I	E	G	G	E	G	E	E	G	G

FILM KEY:

- A. HDPE/TIE/NYLON/EVA  
 B. HDPE/TIE/EVOH/EVA  
 C. HDPE/TIE/NYLON/TIE/EVOH/TIE/NYLON/TIE/HDPE  
 D. HDPE/TIE/MODIFIED NYLON/TIE/HDPE
- E. NYLON/EVOH/NYLON/TIE/LLDPE/TIE/LLDPE  
 F. (ORIENTED)PP/TIE/EVOH/TIE/PP  
 G. PP/TIE/PEI/TIE/PP  
 H. PVDC COATED CO-EX OPP  
 I. MAX PAPER/GLASSINE

E : Excellent

G : Good

F : Fair

P : Poor

PPPI 008496



Table 3

<u>Rating</u>	<u>Number</u>
E (Excellent)	4
G (Good)	3
F (Fair)	2
P (Poor)	1

PPPI 008497

Table 4

<u>Film</u>	<u>Sum for Ratings for Barrier Properties of Flexed Films</u>	<u>Rating Sum</u>
A. HDPE/TIE/ NYLON/EVA	1.25 mil	29
B. HDPE/TIE/EVOH/EVA	1.25 mil	27
C. HDPE/TIE/NYLON/TIE/EVOH/TIE/NYLON/TIE/HDPE	1.40 mil	33
D. HDPE/TIE/MODIFIED NYLON/TIE/HDPE	2.20 mil	35
E. NYLON/EVOH/NYLON/TIE/LLDPE/TIE/LLDPE	3.50 mil	34
F. (ORIENTED) PP/TIE/EVOH/TIE/PP	1.00 mil	33
G. PP/TIE/PET/TIE/PP	1.00 mil	22
H. PVDC COATED CO-EX OPP	1.80 mil	24
I. Wax Paper/Glassine		31 (unflexed)

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**TAB S**  
**TO EXHIBIT 14**

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**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

CRYOVAC, INC.,	)	
	)	
Plaintiff/Counter-Defendant.	)	Civil Action No. 04-1278
	)	
vs.	)	Hon. Kent A. Jordan
	)	
PECHINEY PLASTIC PACKAGING, INC.,	)	
	)	
Defendant/Counter-Plaintiff.	)	
	)	

**DECLARATION OF ELDRIDGE M. MOUNT III IN SUPPORT OF  
PECHINEY'S BRIEF ON CLAIM CONSTRUCTION AND  
PECHINEY'S MOTION FOR SUMMARY JUDGMENT ON PATENT ISSUES**

I, Eldridge M. Mount, declare as follows:

1. I am currently the President of EMMOUNT Technologies.
2. I have been retained by Pechiney as an expert in this case.
3. I received my B.A. degree in Chemistry from West Chester State College, West Chester, Pennsylvania in 1972. I received my M.E. degree in Chemical Engineering from Rensselaer Polytechnic Institute, Troy, New York, in 1976 and my Ph.D. degree in Chemical Engineering from Rensselaer Polytechnic Institute in 1979.
4. I worked at Mobil Chemical Films Division as a Research Associate from 1981-1997 and as the Manager of Exploratory R&D from 1997-2000.
5. I made this declaration in support of Pechiney's Brief on Claim Construction and Pechiney's Motion for Summary Judgment on Patent Issues.
6. I have prepared the Expert Report of Eldridge M. Mount III, dated May 19, 2005, attached as Tab A. The opinions expressed in the Expert Report of Eldridge M. Mount III are my own and I have personal knowledge of the facts recited. I am adopting all my opinions

<b>Defendant's Trial Exhibit 714</b>
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COLUMBIA PROPERTIES

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expressed in the Expert Report of Eldridge M. Mount III for the purpose of providing support for Pechiney's Brief on Claim Construction and Pechiney's Motion for Summary Judgment on Patent Issues.

7. I have prepared the Rebuttal Expert Report Prepared by Dr. Eldridge M. Mount III, dated June 17, 2005, attached as Tab B. The opinions expressed in the Rebuttal Expert Report Prepared by Dr. Eldridge M. Mount III are my own and I have personal knowledge of the facts recited. I am adopting all my opinions expressed in the Rebuttal Expert Report Prepared by Dr. Eldridge M. Mount III for the purpose of providing support for Pechiney's Brief on Claim Construction and Pechiney's Motion for Summary Judgment on Patent Issues.

8. I have prepared the Responsive and Supplement Expert Report of Dr. Eldridge M. Mount III, dated July 1, 2005, attached as Tab C. The opinions expressed in the Responsive and Supplemental Expert Report of Dr. Eldridge M. Mount III are my own and I have personal knowledge of the facts recited. I am adopting all my opinions expressed in the Responsive and Supplemental Expert Report of Dr. Eldridge M. Mount III for the purpose of providing support for Pechiney's Brief on Claim Construction and Pechiney's Motion for Summary Judgment on Patent Issues.

9. I have prepared the Second Supplemental Expert Report of Eldridge M. Mount III, dated September 13, 2005, attached as Tab D. The opinions expressed in the Second Supplemental Expert Report of Eldridge M. Mount III are my own and I have personal knowledge of the facts recited. I am adopting all my opinions expressed in the Second Supplemental Expert Report of Eldridge M. Mount III for the purpose of providing support for Pechiney's Brief on Claim Construction and Pechiney's Motion for Summary Judgment on Patent Issues.

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COLUMBIA PROPERTIES

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10. Multilayer films are often used because the combination of materials in a multilayer film typically can provide more desirable features than any one material can do alone.

11. The sealant layer and the surface layer in ClearShield™ bags have different functions that are best met by layers with different compositions and different thicknesses.

12. Important considerations often taken into account when designing multilayer packaging films include oxygen, flavor and aroma barrier protection; puncture resistance; abuse resistance; optical properties; shrink properties, and scalability, among others.

13. If the article being packaged in the packaging film is oxygen sensitive, the film must be relatively impermeable to oxygen. Therefore, one of ordinary skill in the art would design the film so that one or more layers comprise a material with good oxygen barrier characteristics, such as ethylene vinyl alcohol (EVOH).

14. If it was desirable that the film fit tightly around the article to be packaged, the person of ordinary skill in the art would have known that the film needed to shrink, and would have known to make the film using of the prior art processes that included an orientation step so that the resulting film was heat shrinkable.

15. Subparagraph (d) of the claim 11 of the '419 patent requires that the structure contains two "adhesive" layers and further requires that each adhesive layer must bind an intermediate layer (b) to an outer layer (c).

16. The ordinary meaning of "film" is understood by a person of ordinary skill in the art as a web of material(s), often plastic.

17. The ordinary meaning of "layer" is understood by a person of ordinary skill in the art as one thickness of material laid or lying over or under another.

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18. The Instron Tester and the Cross Polarization test are reliable methods of determining the existence of film orientation and are generally accepted by individuals in the film industry.

19. The layers of the HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE film tested by Dr. Gilbert and identified as film "C" in the Journal of Food Science Article are arranged symmetrically under Pechiney's proposed definition of arranged symmetrically.

20. The HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE film tested by Dr. Gilbert and identified as film "C" in the Journal of Food Science Article was a film of (a) core layer comprising an ethylene vinyl alcohol copolymer; (b) two intermediate layers of nylon, a polyamide; (c) two outer layers of HDPE, a polymeric material; and (d) two tie layers, i.e., adhesive polymeric material, which adhere each nylon layer to its respective outer HDPE layer.

21. The thickness of the nine layer film identified as "C" in the Allied New Release would indicate to one of ordinary skill in the art that this film was oriented because it would be extremely difficult to make a nine layer film having a thickness of 1.4 mils without stretching the melt or reheated film to achieve the desired thickness. This stretching inherently orient the film.

22. A skilled artisan, confronted with the problem of designing a film for packaging applications that has good oxygen barrier properties, good optical properties, heat shrinkability, and superior toughness would have been motivated to orient the HDPE/TIE/NYLON/EVOH/NYLON/TIE/HDPE film tested by Dr. Gilbert.

23. A skilled artisan, confronted with the problem of designing a film for packaging applications that has good oxygen barrier properties, good optical properties, heat shrinkability, and superior toughness would have been motivated to orient the film identified as "C" in the Allied News Release.

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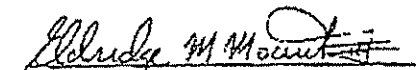
COLUMBIA PROPERTIES

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24. There would be have been a reasonable expectation of success by one of ordinary skill in the art to orient a multilayer, coextruded film containing nylon/EVOH/nylon layer combinations.

I declare under penalty of perjury that the foregoing is true and correct.

Date: October 18, 2005

  
Eldridge M. Mount III



**TABS T - X**  
**TO EXHIBIT 14**

**REDACTED IN FULL**